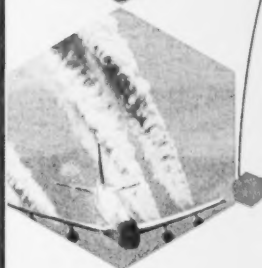
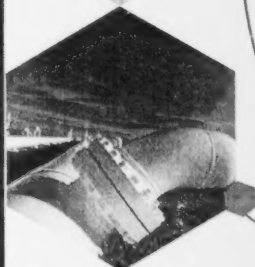




Annual Report to Parliament 2006-2007

Transportation Safety Board of Canada



Transportation Safety Board of Canada
Place du Centre
200 Promenade du Portage
4th Floor
Gatineau, Quebec K1A 1K8
819-994-3741
1-800-387-3557
www.tsb.gc.ca
communications@tsb.gc.ca

© Minister of Public Works and Government Services
Cat. No. TU1-2007
ISBN 978-0-662-69848-7

ANNUAL REPORT TO PARLIAMENT 2006-2007

Place du Centre
200 Promenade du Portage
4th Floor
Gatineau, Quebec K1A 1K8

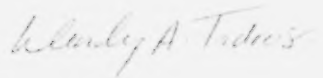
22 August 2007

The Honourable Rona Ambrose, P.C., M.P.
President of the Queen's Privy Council for Canada
House of Commons
Ottawa, Ontario K1A 0A6

Dear Minister:

In accordance with subsection 13(3) of the *Canadian Transportation Accident Investigation and Safety Board Act*, the Board is pleased to submit, through you, its annual report to Parliament for the period 01 April 2006 to 31 March 2007.

Yours sincerely,



Wendy A. Tadros
Chair

Table of Contents

The Chair's Message	1
Section 1: Overview	3
1.1 Members of the Board	3
1.2 Senior Management	4
1.3 Mission of the TSB	4
1.4 Independence	4
Section 2: Activities	5
2.1 Occurrences, Investigations and Safety Action	5
2.2 Communicating Transportation Safety to Canadians and the Transportation Community	8
2.3 Marine Sector	9
2.3.1 Annual Statistics	9
2.3.2 Investigations	11
2.3.3 Safety Actions Taken	12
2.3.3.1 Marine Recommendations Issued in 2006-2007	12
2.3.3.2 Assessment of Responses to Marine Recommendations Issued in 2005-2006	12
2.3.3.3 Other Marine Safety Actions	15
2.4 Pipeline Sector	15
2.4.1 Annual Statistics	15
2.4.2 Investigations	17
2.4.3 Safety Actions Taken	17
2.4.3.1 Other Pipeline Safety Actions	17
2.5 Rail Sector	18
2.5.1 Annual Statistics	18
2.5.2 Investigations	20
2.5.3 Safety Actions Taken	20
2.5.3.1 Rail Recommendations Issued in 2006-2007	20
2.5.3.2 Other Rail Safety Actions	21
2.6 Air Sector	22
2.6.1 Annual Statistics	22
2.6.2 Investigations	24
2.6.3 Safety Actions Taken	24
2.6.3.1 Air Recommendations Issued in 2006-2007	25
2.6.3.2 Assessment of Responses to Air Recommendations Issued in 2005-2006	28
2.6.3.3 Other Air Safety Actions	36

Appendices

Appendix A – Reports Released by the TSB in 2006-2007 by Sector	39
Appendix B – Glossary	43

Figures

Figure 1 – Occurrences Reported to the TSB	5
Figure 2 – Investigations Started, in Process, and Completed.....	6
Figure 3 – Marine Occurrences and Fatalities	10
Figure 4 – Canadian-Flag Shipping Accident Rates.....	11
Figure 5 – Pipeline Occurrences	16
Figure 6 – Pipeline Accident Rates.....	16
Figure 7 – Rail Occurrences and Fatalities	19
Figure 8 – Main-Track Accident Rates.....	19
Figure 9 – Air Occurrences and Fatalities	23
Figure 10 – Canadian-Registered Aircraft Accident Rates.....	23

Tables

Table 1 – Safety Outputs by the TSB	7
Table 2 – Board Assessment of Responses to Recommendations.....	8
Table 3 – Marine Productivity	12
Table 4 – Pipeline Productivity.....	17
Table 5 – Rail Productivity	20
Table 6 – Air Productivity	24

The Chair's Message

I am proud to assume the leadership of the Transportation Safety Board of Canada, an organization that is recognized worldwide for its professional competence and important contributions to transportation safety.

In a time where Canadians expect safe transportation, the TSB actively promotes a culture of safety by conducting independent accident investigations, by identifying safety deficiencies and by making recommendations we believe will advance safety in our marine, pipeline, rail and aviation sectors. One investigation at a time, the TSB has established its credibility with industry and regulators, and continues to build public awareness of our role in the transportation field and in the need for independent accident investigation.

The TSB recognizes that, in order to be effective, we must not only demonstrate technical competency but relevance to Canadians. The TSB was challenged this year by the need to complete an increasing number of very complex investigations while at the same time significantly reducing the number of investigations in progress. We understand the need to reduce the average time it takes to complete an investigation while ensuring we maintain the high quality Canadians expect in all of our work.

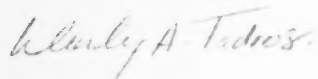
Our goal is to build upon well-established strengths while focusing on areas where improvements are required. This is a question of balancing the number of new investigations against the available resources. It also means that, to serve Canadians in a timely manner, we do not wait for the production of our final report into an occurrence. If we find unsafe conditions during the course of an investigation, we act immediately by communicating with those who can make transportation safer.

During the past year, the TSB achieved results for Canadians by identifying a broad range of safety deficiencies and by conveying key safety messages to the public, industry and regulators. In addition to making 57 investigation reports public, the TSB issued a total of 61 safety outputs to both the regulators and the transportation industry: 6 recommendations, 32 safety advisories and 23 safety information letters.

We are communicating safety knowledge to Canadians and to the international community better and more often. This not only makes transportation safer more quickly, it also raises awareness about the work we do. Notably, our participation at conferences, seminars and technical meetings on transportation safety has allowed us to influence opinion within the transportation industry and to keep abreast of technological change. Our website has proved a very effective way for the TSB to get the word out about what is needed to make the transportation system safer.

TSB recommendations continue to be positively received. The safety action taken as a result of our work underscores the important contribution made by this organization in the reduction of risks in the Canadian and international transportation system. We are convinced that our work will continue to contribute to Canada's excellent safety record.

As I report to Parliament on this year and as I look to the future, I am confident that the TSB is up to meeting the challenges that lie ahead. Rest assured that everyone at the TSB remains firmly committed to advancing transportation safety for Canadians.

A handwritten signature in cursive script, reading "Wendy A. Tadros".

Wendy A. Tadros
Chair

Section 1: Overview

1.1 Members of the Board



Chair Wendy A. Tadros

Transportation and legal experience includes Director of Legal Services for the National Transportation Agency of Canada; Inquiry Coordinator for "The Road to Accessibility: An Inquiry into Canadian Motor Coach Services"; and counsel to the Canadian Transport Commission before the Commission of Inquiry into the Hinton Train Collision.



Member Jonathan Seymour

Transportation policy and marine management experience includes Executive Director of International Maritime Centre–Vancouver; chartering, commercial and general manager for several shipping companies; marine policy advisor to the British Columbia government; and policy and economic consultant.



Member James P. Walsh

Was the Member of the House of Assembly in Newfoundland and Labrador for the district of Conception Bay East–Bell Island from 1989 to 2003. Served as Minister of Works, Services and Transportation, and also served as Minister of Tourism and Culture, Parliamentary Secretary to the Minister of Finance and Treasury Board, and Parliamentary Secretary responsible for the Newfoundland and Labrador Housing Corporation. Also served as Caucus Chairman and Vice-Chair of the Public Accounts Committee. In 2003, received the distinction of Honorary Life Member of the Transportation Association of Canada.



Member R. Henry Wright

Management and consulting experience includes auditor for the Ontario Ministry of Community and Social Services; senior management administrator of several non-profit organizations; and consultant in government and public relations.

1.2 Senior Management

Executive Director	G. McDonald
General Counsel	A. Harding
Director General, Investigation Operations	T. Burtch
Director General, Corporate Services	J.L. Laporte
Director, Marine Investigations	Y. Myers
Director, Rail/Pipeline Investigations	I. Naish
Director, Air Investigations	N. Stoss
Director, Engineering	N. Cerullo

1.3 Mission of the TSB

We conduct independent safety investigations and communicate risks in the transportation system.

1.4 Independence

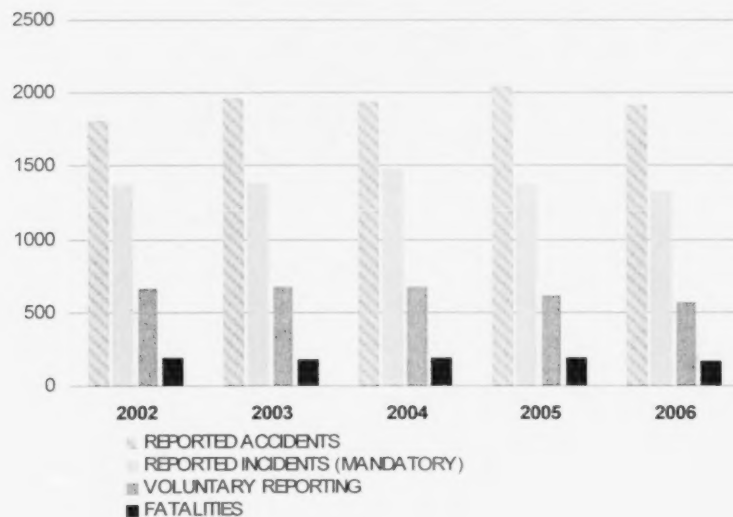
To encourage public confidence in transportation accident investigation, the investigating agency must be, and be seen to be, objective, independent and free from any conflicts of interest. The key feature of the TSB is its independence. It reports to Parliament through the President of the Queen's Privy Council for Canada and is separate from other government agencies and departments. Its independence enables it to be objective in arriving at its conclusions and recommendations. The TSB's continuing independence and credibility rest on its competence, openness, integrity and the fairness of its processes.

Section 2: Activities

2.1 Occurrences, Investigations and Safety Action

In 2006, a total of 1921 accidents and 1326 incidents were reported in accordance with the TSB's regulations for mandatory reporting of occurrences.¹ The number of accidents in 2006 decreased by 6 per cent from the 2046 accidents reported in 2005 and by 1 per cent from the 2001-2005 annual average of 1946 accidents. The number of reported incidents decreased to 1326 in 2006, down from 1371 in 2005 and the 2001-2005 average of 1414. There were also 564 voluntary incident reports. Fatalities totalled 168 in 2006, down 20 from the 2005 total and 21 from the 2001-2005 average.

Figure 1: Occurrences Reported to the TSB



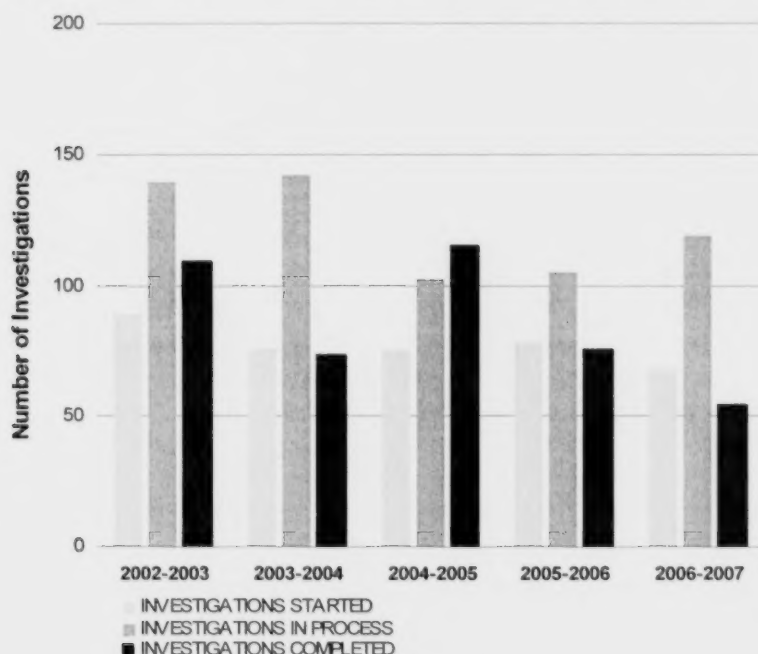
All reported occurrences were examined in accordance with the Board's Occurrence Classification Policy to identify those with the greatest potential for advancing transportation safety. Information was entered into the TSB database for historical record, trend analysis and safety deficiency validation purposes. Investigations were undertaken for 68 of the approximately 4000 occurrences reported to the TSB in fiscal year 2006-2007. In that same period, 57 investigations were completed, compared to 75 in the

¹ While the Board's operations are for the 2006-2007 fiscal year, occurrence statistics are for the 2006 calendar year. Please note that, in a live database, the occurrence data are constantly being updated. Consequently, the statistics can change slightly over time. Comparisons are generally to the last 5 or 10 years. For definitions of terms such as *accident*, *incident* and *occurrence*, see Appendix B.

previous year.² The number of investigations in process increased to 119 at the end of the fiscal year from 105 at the start. Average time to complete an investigation increased to 573 days in fiscal year 2006-2007 from 464 days in the previous year.

While overall report timeliness has shown some improvements in past years, there was a significant increase in 2006-2007. The reduction in the number of investigations completed and the increase in the average time to complete investigations were the result of a combination of factors. The increase in the number of major investigations, a concerted effort to complete older investigations as well as unanticipated management and staff shortages all contributed to this increase. In order to ensure continuing improvement in performance, the TSB has recently completed staffing of a number of key positions, including short-term hiring to address this concern. In addition, the organization is undertaking a full review of its operations to ensure optimal allocation of available resources for the achievement of our mandate and goals.

Figure 2: Investigations Started, in Process, and Completed



Overall, the TSB has been successful in identifying safety deficiencies and in reducing risks in the transportation system. TSB investigations result in reports identifying safety deficiencies and, where appropriate, containing recommendations to reduce risks. Over this past year, in all cases where the TSB undertook an investigation, safety deficiencies or contributing factors were identified and communicated. These results reflect careful

² Investigations are considered complete after the final report has been issued. See Appendix A for a list of reports released by the TSB in 2006-2007 by sector.

application of the TSB's Occurrence Classification Policy in deciding whether to investigate, and a thorough implementation of the investigation methodology. This systematic approach ensures that TSB investigation resources are invested in areas with the greatest potential safety payoffs.

In 2006-2007, in addition to investigation reports, the TSB issued a total of 61 safety outputs: 6 recommendations, 32 safety advisories and 23 safety information letters (see Table 1 for a breakdown by sector).

Table 1: Safety Outputs by the TSB

Sector	Recommendations ³	Safety Advisories	Safety Information Letters
Marine	0	8	8
Pipeline	0	0	1
Rail	2	8	2
Air	4	16	12
TOTAL	6	32	23
Note: In 2006-2007, a total of 3 marine safety concerns, 3 rail safety concerns and 6 air safety concerns were identified.			

Safety information is also provided informally to key stakeholders throughout the investigation process, permitting them to take immediate safety actions where appropriate. It is common practice for industry and government to take safety actions during the course of TSB investigations. Such safety actions range widely in scope and importance. Operators will often take immediate remedial action after discussion with TSB investigators (for example, to clear the sight-lines at a railway crossing by trimming bushes and vegetation). Regulators such as Transport Canada and the Federal Aviation Administration in the United States regularly issue mandatory directives requiring inspections and/or component replacement based on the TSB's preliminary findings. In such situations, rather than issuing recommendations, the TSB can then report on the corrective actions already taken by industry and government agencies.

In accordance with the *Canadian Transportation Accident Investigation and Safety Board Act*, a federal minister who is notified of a TSB recommendation must, within 90 days, advise the Board in writing of any action taken or proposed to be taken in response, or the reasons for not taking action. The Board considers each response, assessing the extent to which the related safety deficiency was addressed. When a recommendation generates responses from within and outside Canada, the Board's assessment is based primarily on the Canadian response. This year, the TSB continued to publish on its website (www.tsb.gc.ca) its assessment of industry and government organization responses to its recommendations made after January 1, 2005.

³ For definitions of terms such as *recommendation*, *safety advisory* and *safety information letter*, see Appendix B.

Table 2: Board Assessment of Responses to Recommendations

Responses Received in Fiscal Year 2006-2007	Fully Satisfactory Attention to Safety Deficiency	Satisfactory Intent to Address Safety Deficiency	Attention to Safety Deficiency Satisfactory in Part	Unsatisfactory Attention to Safety Deficiency	To be Assessed	TOTAL
Marine	1	0	2	0	0	3
Pipeline	0	0	0	0	0	0
Rail	0	0	0	0	2	2
Air	2	3	2	0	3	10
TOTAL	3	3	4	0	5	15

2.2 Communicating Transportation Safety to Canadians and the Transportation Community

One of the central challenges in advancing transportation safety has been convincing the many actors in the industry that change is necessary to lessen the risk. This has led the TSB to adopt a number of tools to convey the findings achieved through investigations. During the past year, the TSB identified a number of safety deficiencies and delivered key safety messages to the public, industry and regulators. As in past years, that approach has proved to be quite effective and continues to be supported to increase effectiveness. In an effort to improve the uptake of its recommendations, the TSB has begun to target its safety messages to narrower and more specialized audiences who are in a position to act directly. The Outreach Program was developed to promote safety where specific departments, elected officials and industry leaders have an important role to play. To that end, the TSB has identified the need to become more active with its Outreach Program and is striving to increase the number of outreach opportunities that are undertaken each year by the Chair, Board members, senior executives and staff. We anticipate that this effort will be rewarded in years to come as we expand the reach of our messages and the safety of Canada's transportation system continues to improve.

In June 2006, a new Executive Director of the TSB was appointed. One of his first challenges was to meet with representatives from the transportation industry and other interested parties. Over four months, the Executive Director met with various airline companies, rail operators, manufacturers, transportation associations and councils, airport authorities, and medical examiners. He made a presentation to the Railway Association of Canada and attended a number of safety association meetings and conferences.

TSB staff and Board members also participated in various conferences and technical meetings pertinent to transportation safety to keep abreast of technological change and to make presentations on safety issues of particular interest to the audiences. To complement these meetings, the TSB wrote and distributed technical and feature articles that have been published in specialized magazines. In these ways, the TSB has taken advantage of various forums as opportunities to share lessons learned from its investigations.

In 2006-2007, the TSB published 57 investigation reports, as well as monthly and annual statistical reports, and continues to maintain a proactive approach to the dissemination of information. Pertinent information is made readily available to industry, next-of-kin, the media and the public throughout the investigation process. Investigators are encouraged to maintain a dialogue with key stakeholders, including the early communication of safety issues that arise during the investigation. The TSB tries to satisfy both the public and the media's expectation for up-to-date factual information. In 2006-2007, 631 subscribers joined its website for a total of 2065 subscribers, and the TSB responded to 749 information requests received through its website and 643 media calls, not including those inquiries handled at an accident site or at a report release news conference. The TSB attended 3 outreach events, held 6 news conferences and issued 19 news releases. The TSB Macro-Analysis Division responded to 370 requests for complex transportation occurrence database information.

The TSB also uses its website to increase awareness of safety issues and other transportation safety information. The TSB website (www.tsb.gc.ca) received an average of more than 92 930 daily hits and 6409 daily visits, a 31 per cent increase in daily visits over the previous year. The visitors are Canadians and people from all around the world. The increased traffic can be partly attributed to the media coverage given to certain accidents, the press releases issued by the TSB, the ease of access to the site and the vast amount of information found.

Although it is difficult to measure the results of TSB activity in this area, tangible signs continue to point toward a certain degree of effectiveness in achieving the desired outcome. For instance, requests for TSB safety information continue to increase year after year. Stakeholders and the media make use of TSB safety messages in their activities. There is a sustained level of interest, both in Canada and around the world, in TSB techniques and methodologies.

2.3 Marine Sector

2.3.1 Annual Statistics

In all, 467 marine accidents were reported to the TSB in 2006, a 4 per cent decrease from the 2005 total of 489 and an 8 per cent decrease from the 2001-2005 average of 506. Marine fatalities totalled 18 in 2006, down from both the 2005 total of 20 and the 2001-2005 average of 25.

Shipping accidents, which comprised 90 per cent of marine accidents, reached a 30-year low of 419 in 2006, down from 444 in 2005 and from the five-year average of 455. Nearly half of all vessels involved in shipping accidents were fishing vessels. Accidents to persons aboard ship, which include falls, electrocution, and other types of injuries requiring hospitalization, totalled 48 in 2006, a 7 per cent increase from the 2005 total of 45 but a 6 per cent decrease from the five-year average of 51.

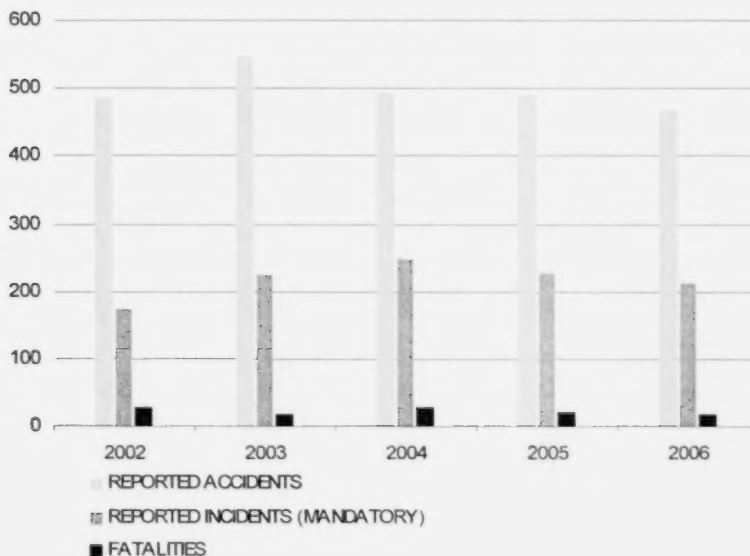
Marine activity for Canadian commercial non-fishing vessels (excluding passenger vessels and cruise ships) increased by 1 per cent from the 2001-2005 average, resulting in a 7 per cent decrease in the accident rate from 3.6 to 3.3 accidents per 1000 movements. Although marine activity for foreign commercial non-fishing vessels remained relatively unchanged compared to the 2001-2005 average, accidents increased, yielding an 11 per cent increase in the accident rate from 1.6 to 1.8 accidents per 1000 movements.

In 2006, shipping accidents resulted in 12 fatalities, down from 13 in 2005 and the five-year average of 16. Accidents aboard ship resulted in 6 fatalities, down 1 from the 2005 total and down 3 from the five-year average.

Thirty-one vessels were reported lost in 2006, up from the 2005 total of 26 but down from the five-year average of 34.

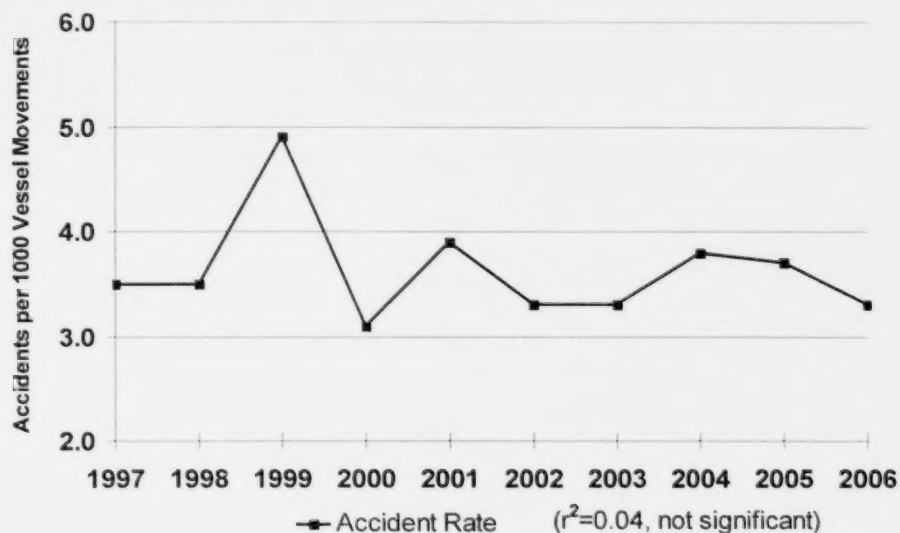
In 2006, 212 marine incidents were reported to the TSB in accordance with the mandatory reporting requirements. This represents a 7 per cent decrease from the 2005 total of 227 and a 5 per cent decrease from the five-year average of 222.

Figure 3: Marine Occurrences and Fatalities



One indicator of marine safety in Canada is the Canadian-flag shipping accident rate. This accident rate has decreased from 3.7 accidents per 1000 movements in 2005 to 3.3 in 2006, but no significant statistical trend was found.

Figure 4: Canadian-Flag Shipping Accident Rates



2.3.2 Investigations

In 2006-2007, 8 marine investigations were started and 8 investigations were completed. This represents a decrease (from 12 to 8) of the number of investigations completed compared to 2005-2006. The decrease is still linked to the delay to staff vacant positions. The average duration of completed investigations increased to 801 days compared to 651 days the year before and to 797 days between 2002-2003 and 2005-2006. This is attributable to concentrated efforts to complete older investigations.

Table 3: Marine Productivity

	2002-2003	2003-2004	2004-2005	2005-2006	2006-2007
Investigations Started	13	14	16	17	8
Investigations Completed	15	18	21	12	8
Average Duration of Completed Investigations (Number of Days)	703	953	881	651	801
Recommendations	5	7	4	6	0
Safety Advisories	7	6	9	5	8
Safety Information Letters	14	11	8	8	8
Note: Results can fluctuate significantly from year to year due to a number of factors such as staff turnover, the complexity of investigations and the investigation of major occurrences.					

2.3.3 Safety Actions Taken

The Marine Branch reassessed responses to 42 recommendations issued in previous years. With Board approval, 9 recommendations went from active to inactive status and 33 recommendations remained active. The Board's reassessments were communicated to the appropriate change agent(s) for information and action.

2.3.3.1 Marine Recommendations Issued in 2006-2007

No marine safety recommendations were issued in 2006-2007.

2.3.3.2 Assessment of Responses to Marine Recommendations Issued in 2005-2006

Capsizing and Loss of Life, Small Fishing Vessel <i>Ryan's Commander</i>, off Cape Bonavista, Newfoundland and Labrador, 19 September 2004	
Report No. M04N0086	
RECOMMENDATION	M05-04
	The Department of Transport ensure that the Board's previous recommendations M03-05 and M03-06 are immediately implemented.

Capsizing and Loss of Life, Small Fishing Vessel *Ryan's Commander*, off Cape Bonavista, Newfoundland and Labrador, 19 September 2004

Report No. M04N0086

RESPONSE	The Minister of Transport, Infrastructure and Communities agrees with the intent of the recommendation. Until such time as the new Fishing Vessel Safety Regulations come into force, Transport Canada (TC) has established an interim measure for determining, based on a list of risk factors, whether a small fishing vessel requires a stability booklet. This interim measure will take effect immediately, and will also serve to remind vessel owners of their responsibility to make safe operational decisions that ensure an adequate margin of safety.
BOARD ASSESSMENT OF RESPONSE	TC issued Ship Safety Bulletin 04/2006 (<i>Safety of Small Fishing Vessels: Information to Owners/Masters about Stability Booklets</i>). The bulletin describes the interim safety measure and the process for determining whether a small fishing vessel requires a stability booklet and what to do if it does. The bulletin applies to all owners and operators of fishing vessels, new and existing, that are between 15 and 150 gross tons, or not more than 24.4 m in length.
BOARD ASSESSMENT RATING	Fully Satisfactory

Engine Room Fire and Subsequent Failure of the CO₂ Distribution Manifold, Ro-Ro Passenger Ferry *Queen of Surrey*, Queen Charlotte Channel, British Columbia, 12 May 2003

Report No. M03W0073

RECOMMENDATION	M05-05 The Department of Transport, in conjunction with other stakeholders, review Canadian and international marine regulations respecting fixed fire-extinguishing systems to ensure that their design, maintenance, inspection, and testing regimes effectively demonstrate continued structural and functional integrity.
RESPONSE	The Minister of Transport, Infrastructure and Communities agrees with this recommendation. As part of the regulatory reform regime initiative, TC will review international marine regulations and standards respecting fixed fire-extinguishing system design, maintenance, inspection, and testing. The goal of this

**Engine Room Fire and Subsequent Failure of the CO₂ Distribution Manifold,
Ro-Ro Passenger Ferry *Queen of Surrey*, Queen Charlotte Channel,
British Columbia, 12 May 2003**

Report No. M03W0073

	review will be aimed at determining whether the proposed Fire Safety Regulations will involve additional requirements to address potential deficiencies that may arise with fixed smothering system installations. The review will assess all aspects of maintenance, testing, and inspections to demonstrate continued structural and functional integrity. These regulations are scheduled to come into force in 2007.
BOARD ASSESSMENT OF RESPONSE	It is anticipated that TC will undertake a review as indicated in its initial response to verify that the proposed regulations meet all necessary requirements. TC has begun work to develop the proposed Fire Safety Regulations.
BOARD ASSESSMENT RATING	Satisfactory in Part

RECOMMENDATION	M05-06 The Department of Transport require Canadian passenger vessels over 500 gross tonnage to meet a standard of structural fire protection that ensures a level of safety equivalent to International Convention for the Safety of Life at Sea (SOLAS)-compliant vessels.
RESPONSE	The Minister of Transport, Infrastructure and Communities agrees with the intent of this recommendation. The proposed Fire Safety Regulations will require that new passenger vessels over 150 gross tons meet and in some areas exceed the SOLAS standards for structural fire protection. The proposed regulations will also address modifications made to existing vessels. As a result, any major modification will have to comply with the most recent requirements for structural fire protection.
BOARD ASSESSMENT OF RESPONSE	It is anticipated that TC will undertake a review as indicated in its initial response to verify that the proposed regulations meet all necessary requirements. TC has begun work to develop the proposed Fire Safety Regulations.
BOARD ASSESSMENT RATING	Satisfactory in Part

2.3.4.3 Other Marine Safety Actions

BC Ferries implemented additional procedures to ensure that bridge officers and quartermasters are familiarized with new bridge equipment. TSB Marine Safety Advisory 07/06 on the adequacy of crew familiarization of equipment was sent to BC Ferries following the sinking of the ferry *Queen of the North* (TSB Occurrence M06W0052).

BC Ferries implemented a new procedure for establishing passenger manifests to ensure that the passengers on board its vessels on northern routes are accurately reflected in the passenger manifests maintained ashore. TSB Marine Safety Advisory 09/06 on the adequacy of current guidelines for creating ferry passenger manifests was sent to Transport Canada (TC) and copied to BC Ferries following the sinking of the ferry *Queen of the North* (TSB Occurrence M06W0052).

TC met with industry and government representatives to discuss updating current port procedures for the handling of dangerous cargo at the Port of Saguenay, Quebec. A small explosion had occurred on board a vessel unloading a cargo of explosives (TSB Occurrence M06L0045). TC decided to deploy an inspector to the site when notified of a shipment of dangerous cargo at the port. Also, TC informed the Swedish and German Port State Authorities involved (where the vessel was loaded) of the incident and of the handling and loading of the cargo at the port of loading. TSB Marine Safety Advisory 08/06 on the inadequate explosive cargo handling practices was sent to TC and the Port of Saguenay.

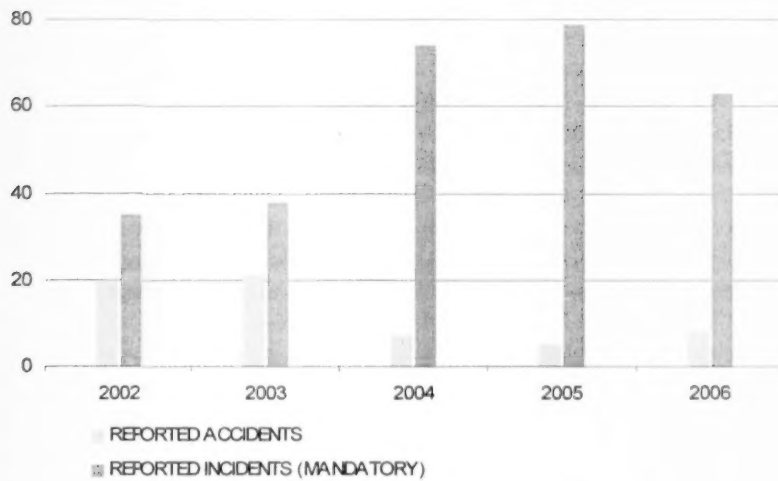
2.4 Pipeline Sector

2.4.1 Annual Statistics

In 2006, 8 pipeline accidents were reported to the TSB, up from the 2005 total of 5 but down from the 2001-2005 average of 15. Pipeline activity is estimated to have increased by 2 per cent from the previous year. The last fatal pipeline accident in the portion of the industry under federal jurisdiction occurred in 1988, and the last accident involving serious injury occurred in 2000.

In 2006, 63 pipeline incidents were reported to the TSB in accordance with the mandatory reporting requirements, down from 79 in 2005 but up from the five-year average of 52. In all, 88 per cent of those incidents involved uncontained or uncontrolled release of small quantities of gas, oil and high-vapour-pressure products.

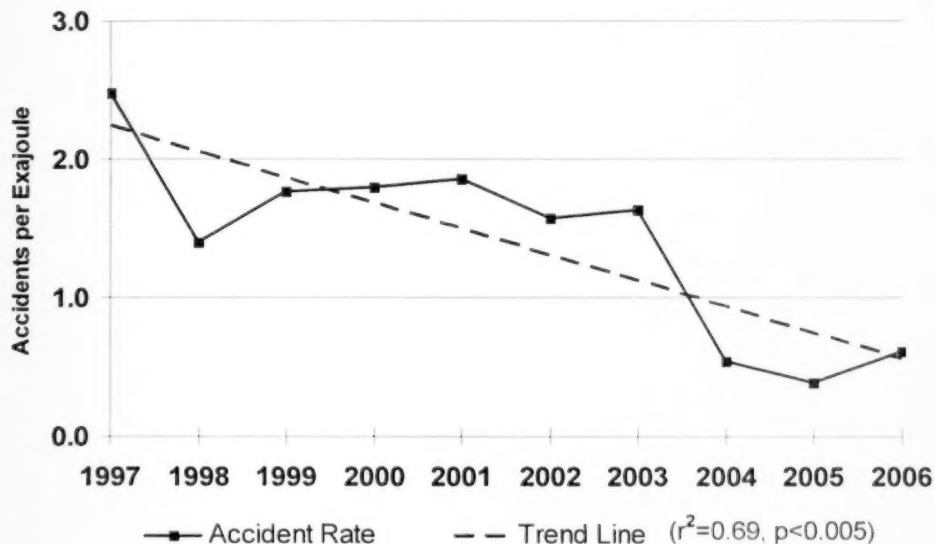
Figure 5: Pipeline Occurrences



* No pipeline fatality has been reported since 1988.

One indicator of pipeline transportation safety in Canada is the pipeline accident rate. This rate increased to 0.6 pipeline accidents per exajoule in 2006, up from 0.4 in 2005 but down from the 2001-2005 average of 1.2. The trend line also indicates a clear downward direction.

Figure 6: Pipeline Accident Rates



2.4.2 Investigations

In 2006-2007, one pipeline investigation was started and one investigation was completed. The completed investigation required 407 days, a significant decrease from 922 days in 2005-2006 (the latter being a very complex investigation that required a high degree of effort to gather and analyze the data).

Table 4: Pipeline Productivity

	2002-2003	2003-2004	2004-2005	2005-2006	2006-2007
Investigations Started	2	0	0	2	1
Investigations Completed	2	0	2	1	1
Average Duration of Completed Investigations (Number of Days)	410	0	1081	922	407
Recommendations	0	0	0	0	0
Safety Advisories	0	0	0	0	0
Safety Information Letters	1	0	0	0	1
Note: Results can fluctuate significantly from year to year due to a number of factors such as staff turnover, the complexity of investigations and the investigation of major occurrences.					

2.4.3 Safety Actions Taken

No pipeline safety recommendations were issued in 2006-2007.

2.4.3.1 Other Pipeline Safety Actions

In response to the Pipeline Safety Information letter, the National Energy Board issued a Safety Advisory to all companies under its jurisdiction, as well as to the Canadian Energy Pipeline Association, the Canadian Association of Petroleum Producers and provincial regulators. The Safety Advisory outlined safety issues related to potential employee injury from ejection of pipeline pigs that have been lodged in receiving traps. Additionally, it itemized actions for organizations to take to address that risk in the future.

2.5 Rail Sector

2.5.1 Annual Statistics

A total of 1144 rail accidents were reported to the TSB in 2006, an 8 per cent decrease from the 2005 total of 1247 but a 5 per cent increase from the 2001-2005 average of 1091. Rail activity is estimated to be comparable to 2005 and to have increased by 4 per cent over the five-year average. The accident rate decreased to 11.9 accidents per million train-miles in 2006, compared to 13.0 in 2005 and the five-year rate of 11.9. Rail-related fatalities totalled 95 in 2006, compared to 103 in 2005 and the five-year average of 96.

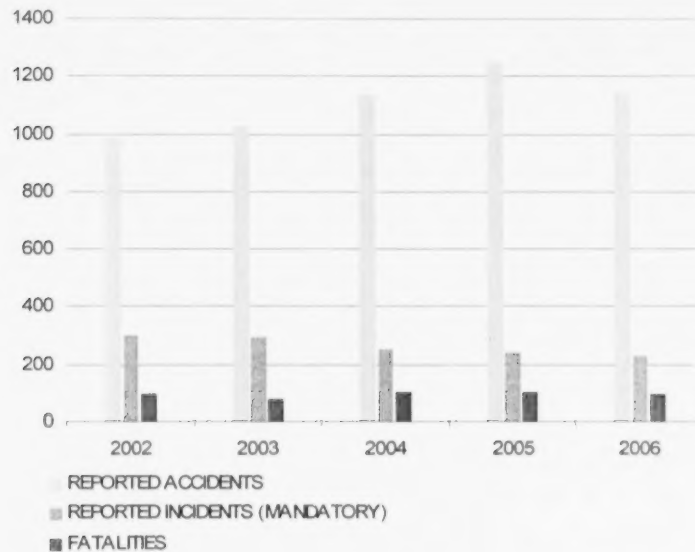
Three main-track collisions occurred in 2006, compared to six in 2005 and the five-year average of six. In 2006, there were 133 main-track derailments, a decrease of 31 per cent from the 2005 total of 194 and 10 per cent from the five-year average of 148. Non-main-track derailments decreased to 480 in 2006 from 540 in 2005, but increased from the five-year average of 422.

In 2006, crossing accidents decreased to 248 from the 2005 total of 269 and from the five-year average of 260. Crossing-related fatalities numbered 28, down from 37 in 2005 and the five-year average of 35. Trespasser accidents decreased by 8 per cent to 59 in 2006 from 64 in 2005, but increased by 4 per cent over the five-year average of 57. With a total of 94 fatalities in 2006, trespasser accidents continue to account for the majority of rail fatalities.

In 2006, 181 rail accidents involved dangerous goods (this also includes crossing accidents in which the motor vehicle is carrying a dangerous good), down from 214 in 2005 and from the five-year average of 215. Three of these accidents resulted in a release of product.

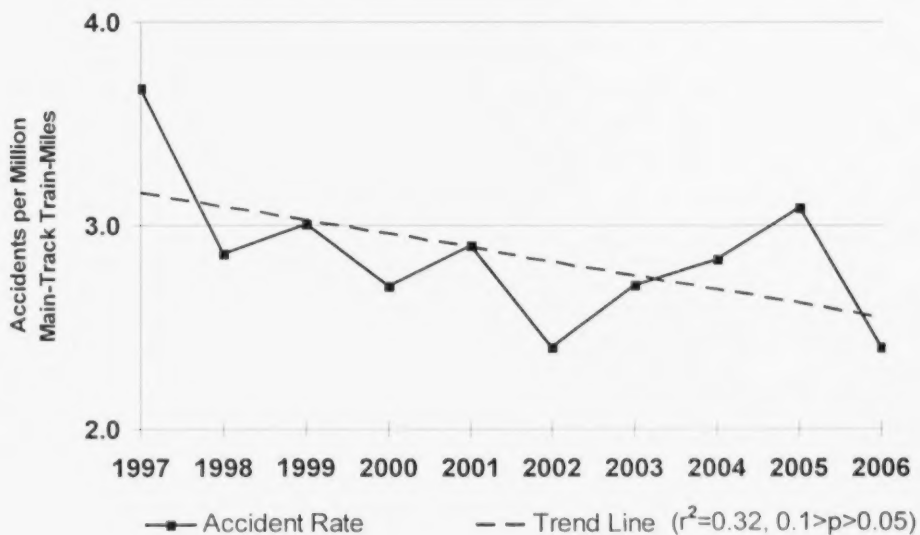
In 2006, rail incidents reported to the TSB in accordance with the mandatory reporting requirements reached a 24-year low of 226, down from 243 in 2005 and the five-year average of 283. For the first time, movements exceeding limits of authority incidents (101) comprised the largest proportion of the 226 reportable incidents, surpassing dangerous goods leaker incidents (86).

Figure 7: Rail Occurrences and Fatalities



One indicator of rail transportation safety in Canada is the main-track accident rate. This rate decreased from 3.1 accidents per million main-track train-miles in 2005 to 2.4 in 2006. Over the past 10 years, the downward trend approaches statistical significance.

Figure 8: Main-Track Accident Rates



2.5.2 Investigations

A total of 18 new rail investigations were started in 2006-2007 and 12 investigations were completed. The average duration of completed investigations increased to 598 days compared to 519 days the year before.

Table 5: Rail Productivity

	2002-2003	2003-2004	2004-2005	2005-2006	2006-2007
Investigations Started	18	14	14	9	18
Investigations Completed	22	15	25	9	12
Average Duration of Completed Investigations (Number of Days)	755	894	618	519	598
Recommendations	5	4	3	0	2
Safety Advisories	6	7	6	9	8
Safety Information Letters	9	11	10	8	2
Note: Results can fluctuate significantly from year to year due to a number of factors such as staff turnover, the complexity of investigations and the investigation of major occurrences.					

2.5.3 Safety Actions Taken

Two rail safety recommendations were issued in 2006-2007.

The Rail Branch reassessed responses to 118 recommendations issued in previous years. With Board approval, 29 recommendations went from active to inactive status and 23 recommendations remained active. The Board's reassessments were communicated to the appropriate change agent(s) for information and action.

2.5.3.1 Rail Recommendations Issued in 2006-2007

Main-Track Derailment, Canadian Pacific Railway Train, Whitby, Ontario, 14 January 2004	
Report No. R04T0008	
RECOMMENDATION	R06-01 The Department of Transport work with the Railway Association of Canada to implement rail traffic control protocols and training that will recognize periods of high workload and make safety paramount.

Main-Track Derailment, Canadian Pacific Railway Train, Whitby, Ontario, 14 January 2004	
Report No. R04T0008	
RESPONSE	Transport Canada (TC) agrees in principle with the recommendation and will work with the industry in the context of this recommendation and other related regulatory initiatives.
BOARD ASSESSMENT OF RESPONSE	To be reported next fiscal year
BOARD ASSESSMENT RATING	Pending

Pedestrian Fatality, Canadian National Train, Brockville, Ontario, 17 February 2005	
Report No. R05T0030	
RECOMMENDATION	R06-02 The Department of Transport assess the risk to pedestrians at all multi-track main-line crossings, make its assessment public and implement a program, in conjunction with stakeholders, to mitigate the risk of second-train pedestrian accidents.
RESPONSE	TC disagrees with the recommendation, challenging the analysis and describing various initiatives taken at many locations. TC must balance a multitude of competing interests when determining how to improve rail safety.
BOARD ASSESSMENT OF RESPONSE	To be reported next fiscal year
BOARD ASSESSMENT RATING	Pending

2.5.3.2 Other Rail Safety Actions

In response to Rail Safety Advisory 03/06 (TSB Occurrence R06T0022), Canadian National (CN) and Canadian Pacific Railway (CPR) accelerated the inspection and removal from service of certain wheel sets that had been identified as having a risk for developing a loose wheel condition.

In response to Rail Safety Advisory 06/06 (TSB Occurrence R06V0136), CN took action with a "blitz" campaign to test locomotive check valves, and defective valves were replaced. Additionally, the mandatory replacement frequency for these valves was increased.

In response to two other Rail Safety Advisories (07/06 and 08/06) concerning TSB Occurrence R06V0183, Transport Canada (TC) issued two Notices under Section 31 of the *Railway Safety Act* to the White Pass & Yukon Route railway on 12 separate operational/equipment issues requiring explanations on how the issues would be resolved.

In response to a Rail Safety Information letter (02/06), CPR took action to ensure that emergency response communications protocols between the Ontario Provincial Police and the company were enhanced and that training procedures were developed and communicated.

In response to Rail Safety Information letter 03/06 (TSB Occurrence R05C0082), TC indicated that future audits will have more emphasis on locomotive side bearing clearance and bolster bowl liner condition.

In response to Rail Safety Information letter 04/06 (TSB Occurrence R05C0082), TC indicated that future inspections and audits will have more emphasis on the inspection of locomotive truck bolster stops.

2.6 Air Sector

2.6.1 Annual Statistics

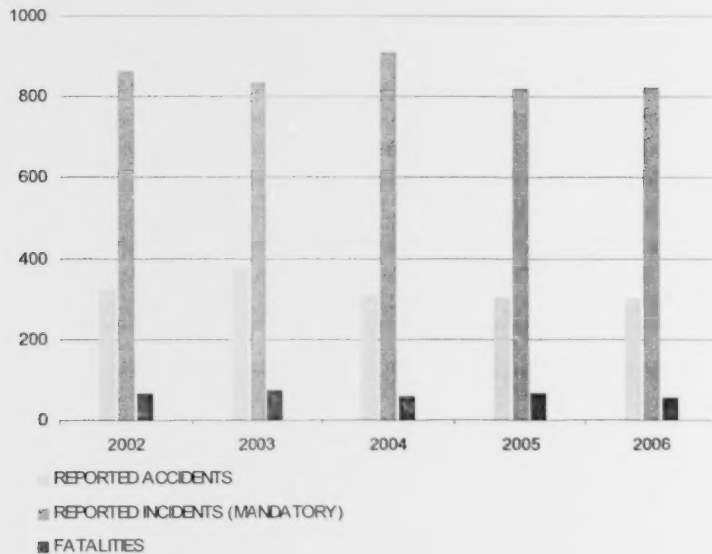
Canadian-registered aircraft, other than ultralights, were involved in 262 reported accidents in 2006, a 2 per cent increase from the 2005 total of 258 but a 5 per cent decrease from the 2001-2005 average of 275. The estimate of flying activity for 2006 is 4 161 000 hours, yielding an accident rate of 6.2 accidents per 100 000 flying hours, unchanged from the 2005 rate but down from the five-year rate of 7.1. Canadian-registered aircraft, other than ultralights, were involved in 31 fatal occurrences with 52 fatalities in 2006, comparable to the 34 fatal occurrences with 51 fatalities in 2005 and the five-year average of 31 fatal occurrences with 52 fatalities. A total of 15 fatal occurrences involved commercial aircraft (6 aeroplanes and 9 helicopters), and 12 of the remaining 16 fatal occurrences involved privately operated aeroplanes.

The number of accidents involving ultralights decreased to 27 in 2006 from 31 in 2005, and the number of fatal accidents decreased substantially to 1 in 2006 from 5 in 2005.

The number of foreign-registered aircraft accidents in Canada decreased to 14 in 2006 from 18 in 2005. Fatal accidents decreased to 2 in 2006 from 6 in 2005.

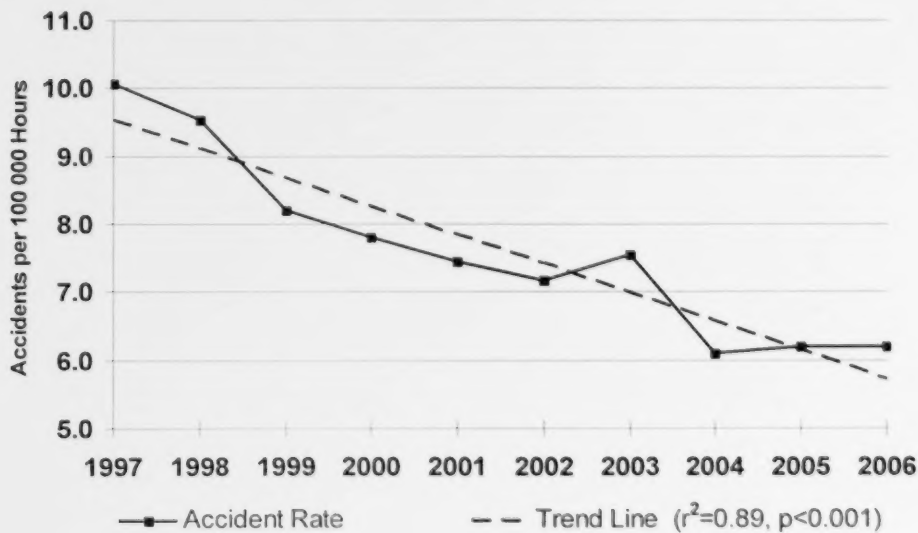
In 2006, a total of 823 incidents were reported to the TSB in accordance with the mandatory reporting requirements. This is comparable to the 2005 total of 822 and a 4 per cent decrease from the 2001-2005 average of 857.

Figure 9: Air Occurrences and Fatalities



One indicator of air transportation safety in Canada is the accident rate for Canadian-registered aircraft. In 2006, this rate has remained unchanged from the 2005 rate of 6.2 accidents per 100 000 hours, but remained below the five-year average of 7.1. The trend line also shows a downward direction over the past 10 years.

Figure 10: Canadian-Registered Aircraft Accident Rates



2.6.2 Investigations

A total of 41 air investigations were started in 2006-2007 and 36 investigations were completed. This represents a decrease in the number of investigations completed compared to the previous year (53). The average duration of completed investigations has increased to 516 days, compared to 404 days the year before. This is attributable to concentrated efforts to complete older investigations.

Table 6: Air Productivity

	2002-2003	2003-2004	2004-2005	2005-2006	2006-2007
Investigations Started	56	47	44	50	41
Investigations Completed	70	40	67	53	36
Average Duration of Completed Investigations (Number of Days)	494	485	524	404	516
Recommendations	17	0	4	6	4
Safety Advisories	13	9	9	7	16
Safety Information Letters	6	8	6	5	12
Note: Results can fluctuate significantly from year to year due to a number of factors such as staff turnover, the complexity of investigations and the investigation of major occurrences.					

2.6.3 Safety Actions Taken

Four air safety recommendations were issued in 2006-2007. One response was assessed as Satisfactory Intent, and initial assessments are pending for the other three.

The Air Branch reassessed responses to 35 recommendations issued in previous years. With Board approval, 7 recommendations went from active to inactive status. At the end of fiscal year 2006-2007, there were 37 active recommendations. The Board's reassessments were communicated to the appropriate change agent(s) for information and action.

2.6.3.1 Air Recommendations Issued in 2006-2007

Reduced Power at Take-off and Collision with Terrain, MK Airlines Limited, Boeing 747-422SF, Halifax International Airport, Nova Scotia, 14 October 2004	
Report No. A04H0004	
RECOMMENDATION	<p>A06-07</p> <p>The Department of Transport, in conjunction with the International Civil Aviation Organization, the Federal Aviation Administration, the European Aviation Safety Agency, and other regulatory organizations, establish a requirement for transport category aircraft to be equipped with a take-off performance monitoring system that would provide flight crews with an accurate and timely indication of inadequate take-off performance.</p>
RESPONSE	<p>Transport Canada (TC) agrees that, if a take-off performance monitoring system (TPMS) could be designed to function as intended, it could provide a significant safety benefit. However, TC believes that, in order for civil aviation authorities to establish a requirement for aircraft to be equipped with a TPMS, an acceptable system would have to exist. TC is not aware of any certified system that is available at this time to meet this recommendation.</p> <p>TC states that it is conceivable that such a system could be designed with current technology. However, a significant effort would be required by private industry and researchers to establish appropriate design criteria, to perform detailed design and system development, and then to conduct significant testing to ensure high reliability before acceptance. In addition, design criteria and standards would also require harmonization with other civil aviation authorities.</p> <p>TC's letter also states that, at this time, TC cannot establish a requirement for aircraft to be equipped with a TPMS but will revisit this issue when a certifiable product is developed.</p>
BOARD ASSESSMENT OF RESPONSE	<p>In its response, TC states that it cannot establish a requirement for a TPMS because it does not know of any certified system available to the industry. However, TC notes TSB's suggestion that research into TPMS technology would be beneficial and consequently has formed a cross-disciplinary project team to look into this</p>

Reduced Power at Take-off and Collision with Terrain, MK Airlines Limited, Boeing 747-422SF, Halifax International Airport, Nova Scotia, 14 October 2004	
Report No. A04H0004	
	subject. TC describes what work has already been accomplished by the project team and outlines details of its action plan, which includes establishing what remains to be done before a certifiable TPMS could be made available, consulting with industry to gauge their interest in a TPMS solution, and working with industry to bring about a certifiable system. Additionally, TC invites TSB's participation in its preliminary research project team.
BOARD ASSESSMENT RATING	Satisfactory Intent

Post-Impact Fires Resulting from Small-Aircraft Accidents, Safety Issues Investigation	
Report No. SII A05-01	
RECOMMENDATION	A06-08 Transport Canada, together with the Federal Aviation Administration and other foreign regulators, revise the cost-benefit analysis for Notice of Proposed Rule Making 85-7A using Canadian post-impact fire statistics and current value of statistical life rates, and with consideration to the newest advances in post-impact fire prevention technology.
RESPONSE	Under review
BOARD ASSESSMENT OF RESPONSE	To be reported next fiscal year
BOARD ASSESSMENT RATING	Pending

**Post-Impact Fires Resulting from Small-Aircraft Accidents,
Safety Issues Investigation**

Report No. SII A05-01

RECOMMENDATION	<p>A06-09</p> <p>To reduce the number of post-impact fires in impact-survivable accidents involving new production aeroplanes weighing less than 5700 kg, Transport Canada, the Federal Aviation Administration, and other foreign regulators include in new aeroplane type design standards:</p> <ul style="list-style-type: none"> - methods to reduce the risk of hot items becoming ignition sources; - technology designed to inert the battery and electrical systems at impact to eliminate high-temperature electrical arcing as a potential ignition source; - requirements for protective or sacrificial insulating materials in locations that are vulnerable to friction heating and sparking during accidents to eliminate friction sparking as a potential ignition source; - requirements for fuel system crashworthiness; - requirements for fuel tanks to be located as far as possible from the occupied areas of the aircraft and for fuel lines to be routed outside the occupied areas of the aircraft to increase the distance between the occupants and the fuel; and - improved standards for exits, restraint systems, and seats to enhance survivability and opportunities for occupant escape.
RESPONSE	Under review
BOARD ASSESSMENT OF RESPONSE	To be reported next fiscal year
BOARD ASSESSMENT RATING	Pending

Post-Impact Fires Resulting from Small-Aircraft Accidents, Safety Issues Investigation	
Report No. SII A05-01	
RECOMMENDATION	<p>A06-10</p> <p>To reduce the number of post-impact fires in impact-survivable accidents involving existing production aircraft weighing less than 5700 kg, Transport Canada, the Federal Aviation Administration, and other foreign regulators conduct risk assessments to determine the feasibility of retrofitting aircraft with the following:</p> <ul style="list-style-type: none"> - selected technology to eliminate hot items as a potential ignition source; - technology designed to inert the battery and electrical systems at impact to eliminate high-temperature electrical arcing as a potential ignition source; - protective or sacrificial insulating materials in locations that are vulnerable to friction heating and sparking during accidents to eliminate friction sparking as a potential ignition source; and - selected fuel system crashworthiness components that retain fuel.
RESPONSE	Under review
BOARD ASSESSMENT OF RESPONSE	To be reported next fiscal year
BOARD ASSESSMENT RATING	Pending

2.6.3.2 Assessment of Responses to Air Recommendations Issued in 2005-2006

Cessna 208 Operation into Icing Conditions, Morningstar Air Express Inc., Winnipeg, Manitoba, 06 October 2005	
Report No. A05C0187	
RECOMMENDATION	<p>A06-01</p> <p>The Department of Transport take action to restrict the dispatch of Canadian Cessna 208, 208A, and 208B aircraft into forecast icing meteorological conditions exceeding "light," and prohibit the continued operation in these conditions, until the airworthiness of the aircraft to operate in such conditions is demonstrated.</p>

**Cessna 208 Operation into Icing Conditions, Morningstar Air Express Inc.,
Winnipeg, Manitoba, 06 October 2005**

Report No. A05C0187

RESPONSE

To address the subject of Cessna 208 operation into icing conditions, the Federal Aviation Administration (FAA) issued Airworthiness Directive (AD) 2006-06-06 on 10 March 2006. This mandatory corrective action allows dispatch into forecast icing meteorological conditions exceeding "light," but requires pilots to exit moderate or more severe icing conditions if such conditions are encountered in flight. Cues are provided to enable pilots to determine when they must depart the icing conditions. The AD discusses the actions necessary to remove the restrictions imposed for flight in icing conditions. The FAA AD became effective 24 March 2006.

On 24 January 2006, Transport Canada (TC) issued Service Difficulty Alert 2006-01. Service Difficulty Alert 2006-01R1 was released on 01 February 2006 and the latest revision 2006-01R2 was released on 24 March 2006.

TC also reviewed FAA AD 2006-06-06. The Department supports the FAA's determination that these actions are necessary for safe operation. FAA AD 2006-06-06 has been accepted and is mandatory in Canada.

**BOARD ASSESSMENT
OF RESPONSE**

TC has essentially adopted the response from the FAA, who issued AD 2006-06-06. Action taken by the FAA will reduce, but not substantially reduce or eliminate, the deficiency raised in Board Recommendation A06-01. The response from TC does not address the issue of restricting the dispatch of the Cessna 208 into icing conditions forecast to exceed "light."

**BOARD ASSESSMENT
RATING**

Satisfactory in Part

RECOMMENDATION

A06-02

The Department of Transport require that Canadian Cessna 208 operators maintain a minimum operating airspeed of 120 knots during icing conditions and exit icing conditions as soon as performance degradations prevent the aircraft from maintaining 120 knots.

**Cessna 208 Operation into Icing Conditions, Morningstar Air Express Inc.,
Winnipeg, Manitoba, 06 October 2005**

Report No. A05C0187

RESPONSE	<p>To address the subject of Cessna 208 operation into icing conditions, the FAA issued AD 2006-06-06 on 10 March 2006. FAA AD 2006-06-06 was issued to implement the content of this recommendation. This mandatory corrective action specifies the minimum speed in icing conditions of 120 knots indicated airspeed (KIAS) in the flaps UP condition, and requires that the pilot depart icing conditions if 120 KIAS cannot be maintained in level flight.</p> <p>On 24 January 2006, TC issued Service Difficulty Alert 2006-01. Service Difficulty Alert 2006-01R1 was released on 01 February 2006 and the latest revision 2006-01R2 was released on 24 March 2006.</p> <p>TC also reviewed FAA AD 2006-06-06. The Department supported the FAA's determination that these actions are necessary for safe operation. FAA AD 2006-06-06 has been accepted and is mandatory in Canada.</p> <p>TC agreed with Recommendation A06-02. TC reviewed FAA AD 2006-06-06, accepted the AD, and it is now mandatory in Canada.</p>
BOARD ASSESSMENT OF RESPONSE	<p>In its response, TC adopted the action of the FAA, who issued AD 2006 06-06. Action taken by the FAA will substantially reduce or eliminate the deficiency raised in Board Recommendation A06-02.</p>
BOARD ASSESSMENT RATING	<p>Fully Satisfactory</p>

RECOMMENDATION	<p>A06-03</p> <p>The Federal Aviation Administration take action to revise the certification of Cessna 208, 208A, and 208B aircraft to prohibit flight into forecast or in actual icing meteorological conditions exceeding "light," until the airworthiness of the aircraft to operate in such conditions is demonstrated.</p>
-----------------------	--

**Cessna 208 Operation into Icing Conditions, Morningstar Air Express Inc.,
Winnipeg, Manitoba, 06 October 2005**

Report No. A05C0187

RESPONSE	On 27 September 2006, the Board received a letter dated 18 September 2006 in which the FAA responded to Recommendation A06-03. The response stated that the FAA agreed with the intent of the recommendation, and has taken action by issuing AD 2006-06-06, which limits the operation of Cessna 208 and 208B in icing conditions. The response also indicated that the FAA assessed its response as fully meeting the intent of this TSB recommendation.
BOARD ASSESSMENT OF RESPONSE	FAA AD 2006-06-06 will require that pilots exit moderate or more severe icing conditions, when such conditions are encountered. In addition, AD 2006-06-06 provides a definition of icing conditions of moderate or greater intensity as they apply to the Cessna 208 and 208B type, identifies several cues to enable pilots to determine when they must depart such icing conditions, and provides guidance on how to exit icing conditions exceeding "light." Notwithstanding, the results of the FAA flight tests and review of accident data have not demonstrated that a Cessna 208 or 208B can successfully exit from such icing conditions. Effectively, the action taken by the FAA still allows the dispatch of aircraft into forecast icing conditions exceeding "light." The FAA action taken will reduce, but will not substantially reduce or eliminate, the deficiency raised in Board Recommendation A06-03.
BOARD ASSESSMENT RATING	Satisfactory in Part

RECOMMENDATION	A06-04 The Federal Aviation Administration require that Cessna 208 operators maintain a minimum operating airspeed of 120 knots during icing conditions and exit icing conditions as soon as performance degradations prevent the aircraft from maintaining 120 knots.
-----------------------	--

**Cessna 208 Operation into Icing Conditions, Morningstar Air Express Inc.,
Winnipeg, Manitoba, 06 October 2005**

Report No. A05C0187

RESPONSE	<p>Although the FAA has not yet provided the TSB with a direct response regarding its actions taken in response to TSB Recommendation A06-04, the FAA letter dated 13 March 2006, in response to National Transportation Safety Board Recommendation A-06-01, is pertinent to the risks identified in TSB Recommendation A06-04. To address the subject of Cessna 208 operation into icing conditions, the FAA issued AD 2006-06-06 on 10 March 2006. FAA AD 2006-06-06 was issued to implement the content of this recommendation. This mandatory corrective action specifies the minimum speed in icing conditions of 120 KIAS in the flaps UP condition, and requires that the pilot depart icing conditions if 120 KIAS cannot be maintained in level flight.</p> <p>On 19 May 2006, the FAA advised the TSB that Recommendation A06-04 had been forwarded to the Wichita Aircraft Certification Office for review and evaluation. The FAA Office of Accident Investigation is waiting for a reply from the Wichita Aircraft Certification Office.</p>
BOARD ASSESSMENT OF RESPONSE	<p>FAA AD 2006-06-06 effectively mandates that 120 KIAS be the minimum Cessna 208 speed for flight in icing conditions as recommended in TSB Recommendation A06-04. The action taken by the FAA will substantially reduce or eliminate the deficiency raised in Board Recommendation A06-04.</p>
BOARD ASSESSMENT RATING	<p>Fully Satisfactory</p>

**Rudder Separation in Flight, Air Transat, Airbus 310-308,
Varadero, Cuba, 06 March 2005**

Occurrence No. A05F0047

RECOMMENDATION

A06-05

The Department of Transport, in coordination with other involved regulatory authorities and industry, urgently develop and implement an inspection program that will allow early and consistent detection of damage to the rudder assembly of aircraft equipped with part number A55471500 series rudders.

RESPONSE

In its 14 June 2006 letter, TC provided the following comments:

- TC concurs with the TSB suggestion that the current A310-300 inspection program may not be adequate to provide timely detection of defects to the rudder assembly. This may be caused by either inappropriate inspection intervals or inadequate inspection techniques.
- At the time of this occurrence, composite materials in general were, from a maintenance perspective, believed to have a no-damage growth design philosophy. It was also believed that, from a fatigue point of view, more frequent inspections of composite materials would not prove to be more effective. In addition, these concepts were an industry-accepted philosophy during the development of maintenance programs using the Maintenance Review Board (MRB) process.
- As a result of this occurrence, and the additional findings based on the Airbus All Operators Telex, TC now believes that there is potential for damage growth. Following this determination, the Department inspected additional Canadian-registered A310-300 series aircraft in order to evaluate the effectiveness of the current Airbus maintenance program.

The following corrective actions are currently being taken by TC:

- TC will send a letter to Airbus Industries and the Direction Générale de l'Aviation Civile (DGAC) of France detailing the results of our additional inspection on a Canadian-registered A310-300 series aircraft.

**Rudder Separation in Flight, Air Transat, Airbus 310-308,
Varadero, Cuba, 06 March 2005**

Occurrence No. A05F0047

	<ul style="list-style-type: none"> - TC will recommend that a detailed inspection of the drainage path of the rudder for blockage be added to the current inspection program to ensure that there is adequate drainage. - TC will request that Airbus Industries review the current inspection program for the vertical stabilizer and rudder assembly for the A300/A310 aircraft series. - Because a tap test, a scheduled inspection of the rudder required at the time of the occurrence, is potentially not effective in determining smaller areas of delamination or disbond of composite materials, TC is currently working with the National Research Council of Canada to identify suitable inspection techniques that will detect failures in composite materials. - To better identify failures in composite material, TC will coordinate with the International MRB Policy Board to review the logic used in developing maintenance programs.
BOARD ASSESSMENT OF RESPONSE	In its 14 June 2006 response, TC stated that it is currently working with the National Research Council of Canada to identify suitable inspection techniques that will detect failures in composite materials. TC will recommend that a detailed inspection of the drainage path of the rudder for blockage be added to the current inspection program to ensure that there is adequate drainage. TC will also request that Airbus Industries review the current inspection program for the vertical stabilizer and rudder assembly for the A300/A310 aircraft series, and will work with the International MRB Policy Board to review the logic used in developing maintenance programs.
BOARD ASSESSMENT RATING	Satisfactory Intent

RECOMMENDATION	<p>A06-06</p> <p>The European Aviation Safety Agency, in coordination with other involved regulatory authorities and industry, urgently develop and implement an inspection program that will allow early and consistent detection of damage to the rudder assembly of aircraft equipped with part number A55471500 series rudders.</p>
-----------------------	--

**Rudder Separation in Flight, Air Transat, Airbus 310-308,
Varadero, Cuba, 06 March 2005**

Occurrence No. A05F0047

RESPONSE	<p>In its response, the European Aviation Safety Agency (EASA) stated that it agreed with the Board recommendation and that AD 2006-0066 issued on 24 March 2006 requiring a mandatory one-time inspection satisfactorily addressed the Board recommendation.</p> <p>On 21 December 2006, following a TSB conference call with the EASA, the latter stated that all elements that may have potentially caused the damage growth were still being investigated. Furthermore, the EASA stated that, within the continued airworthiness process and in cooperation with Airbus Industries, it continues its efforts to determine the most appropriate corrective actions. Subsequently, the EASA will consider mandating those actions, including amending the maintenance program to require repetitive inspections.</p>
BOARD ASSESSMENT OF RESPONSE	<p>Although the EASA agreed with the Board recommendation, AD 2006-0066 referenced in its 22 November 2006 response does not provide for a repetitive inspection cycle that will allow early and consistent detection of damage, as is implied in the core of Recommendation A06-06. Nevertheless, the TSB assessed that the EASA is well positioned to take a leadership role within the industry in advocating for the development and integration of an inspection program dealing with composite materials. On that basis, the 20 December 2006 conference call was initiated.</p> <p>The 17 January 2007 response reflects EASA's commitment to continue to develop corrective actions that may include amending the maintenance program to require repetitive checks.</p>
BOARD ASSESSMENT RATING	Satisfactory Intent

2.6.3.3 Other Air Safety Actions

As a result of Recommendation A04-02 from investigation A04H0001, Transport Canada (TC) re-evaluated the standard weights for passengers and carry-on baggage and adjusted them for all aircraft to reflect current realities. The Federal Aviation Administration (FAA) issued Airworthiness Directive (AD) 2005-07-01, for the Cessna 208 and 208B aircraft. This AD was issued as a result of several accidents and incidents involving Cessna 208 and 208B operating in icing conditions, including this occurrence. The purpose of the AD was to ensure that pilots have enough information to prevent loss of control of the aircraft while in flight during icing conditions.

Following the receipt of TSB Safety Advisory A040058, generated by TSB investigation A04H0004, TC advised that it was developing and would soon dispatch a Commercial and Business Aviation Advisory letter concerning the need for accurate aircraft load control. As well, as a result of TSB Safety Advisory A040059 on erroneous runway slope information, TC sent an Aerodrome Safety Urgent Bulletin to airports and registered aerodromes reminding them of the need to verify published data.

During a TSB risk of collision investigation (A04Q0089), NAV CANADA undertook a major rewrite of the basic visual flight rules air traffic control training course delivered at its training facility and implemented the new curriculum. Emergency procedures are taught in instructor-led classroom activities that include the associated phraseology. Non-compliance situations by a pilot are taught in the classroom, and are practised in a number of exercises in the dynamic 360-degree airport simulator throughout the course.

During the progress of a TSB investigation into a risk of collision incident at Vancouver International Airport, British Columbia (A04P0397), the Vancouver International Airport tower manager issued an Operations Bulletin to remind controllers to adhere to the *Air Traffic Control Manual of Operations* (ATC MANOPS) direction to state the name of the intersection or taxiway when issuing taxi to position instructions or take-off clearances from an intersection. NAV CANADA proposed an amendment to Section RAC 4.2.8 of the *Aeronautical Information Manual* (AIM), which would recommend that pilots include their location with the runway number when requesting take-off clearance.

Pursuant to Safety Advisory A050012 (A05Q0024), TC indicated that it would examine the possibility of adding information on the level of runway certification to the Canada Flight Supplement, which would provide more information and details to pilots regarding any change to the certification status of a given runway.

Following occurrence investigation A05O0112 and the subsequent audit by TC, Rapid Aircraft Repair Inc. hired a Director of Quality Assurance and designated this person as the person responsible for maintenance. The company amended its Quality Assurance Program to ensure closer scrutiny in all aspects of maintenance than was previously possible; implemented a process for regular discussions on process control; implemented the process of a full-control travel check before disassembly; implemented additional training on human factors, improving the reporting of potential problems; and began implementing a safety management system.

Following the commencement of an investigation concerning an inadvertent stick shaker at high altitude (A05W0109), Bombardier Aerospace issued a message to all operators of the CRJ705/900 variants of the CL-65 emphasizing that flight operations should not be conducted below minimum drag speed as defined in the General Speed Section of the Flight Planning Cruise Control Manual for the aircraft type. Air Canada Jazz introduced a nine-module "High Altitude and High Speed Training" program for all CRJ705 pilots. TC published Commercial and Business Aviation Advisory Circular 0247 providing guidance and recommendations to operators for stall recovery training and checking, with the goal of ensuring that flight crews recognize early indications of an approach to a stall and apply the appropriate recovery actions to prevent an aeroplane from entering a stall or upset.

Following a power loss and collision with terrain investigation (A05O0125), the aircraft kit manufacturer posted aircraft information to the technical website used by international owners describing the dangers of using a particular stick grip to actuate trim and flaps.

As a result of TSB investigation A05O0147 (collision with water), the TSB determined that the pilot was able to manoeuvre into the right seat after the aircraft became inverted, but was unable to exit the aircraft. TC undertook a risk assessment, "Egress from Submerged Floatplanes," to identify the risks related to egress from submerged seaplanes and to identify the most effective means of mitigating those risks.

Following the investigation into a helicopter in-flight break-up (A05P0269), Columbia Helicopters Incorporated advised all Boeing 107 helicopter crews of the recurrent procedures to check the operation and serviceability of the speed trim actuator switches. Boeing Aerospace Support-Philadelphia issued Service Bulletin 107-67-1001, requesting that all operators of Model 107 helicopters (BV and KV) and 107 derivatives inspect and functionally test the longitudinal cyclic trim actuator limit switches. Boeing recommended that this test be accomplished before the next flight and before each subsequent flight until further notice.

Appendix A – Reports Released by the TSB in 2006-2007 by Sector

Marine Reports Released in 2006-2007

DATE	LOCATION	VESSEL(S)	TYPE	EVENT	REPORT NO.
2003.12.06	Off Saint-Jean, Île d'Orléans, Que.	<i>Yong Kang</i>	Bulk carrier	Grounding	M03L0148
2003.12.20	Fraser River near Mission, B.C.	<i>Mistral</i> <i>Packmore 4000</i> <i>Tiger Shaman</i>	Pleasure craft Barge Tug	Collision	M03W0265
2004.01.11	Horseshoe Bay Terminal, B.C.	<i>Queen of Surrey</i> <i>Charles H. Cates V</i>	Roll-on/roll-off vehicle/passenger ferry Assist tug	Collision	M04W0006
2004.01.23	Sand Cove, N.B.	<i>Lo-Da-Kash</i>	Small fishing	Sinking and loss of life	M04M0002
2004.06.17	Off Natashquan, Que.	<i>Persistence I</i>	Fishing	Flooding	M04L0065
2004.09.19	Cape Bonavista, N.L., 5 nm E	<i>Ryan's Commander</i>	Small fishing	Capsizing and loss of life	M04N0086
2005.06.03	South Shore Canal, St. Lawrence Seaway, Que.	<i>Federal Sakura</i>	Bulk carrier	Striking	M05C0019
2005.06.29	Off Savary Island, Northern Georgia Strait, B.C.	<i>Morning Sunrise</i>	Fishing	Sinking	M05W0110

Pipeline Report Released in 2006-2007

DATE	LOCATION	COMPANY	EVENT	REPORT NO.
2005.10.18	Near Empress, Alta.	Foothills Pipe Lines Ltd.	Programmable logic controller failure	P05H0061

Rail Reports Released in 2006-2007

DATE	LOCATION	COMPANY	EVENT	REPORT NO.
2004.01.14	Whitby, Ont.	Canadian Pacific Railway	Main-track derailment	R04T0008
2004.07.08	Bend, B.C.	Canadian National	Uncontrolled movement of railway rolling stock	R04V0100
2004.07.25	Burton, Ont.	Canadian National	Derailment	R04T0161
2004.10.06	Castleford, Ont.	Canadian Pacific Railway	Crossing collision	R04H0014
2004.10.24	Near Blackie, Alta.	Canadian Pacific Railway	Crossing accident	R04C0110
2005.01.12	Winnipeg, Man.	Canadian National	Derailment	R05W0014
2005.02.17	Brockville, Ont.	Canadian National	Pedestrian fatality	R05T0030
2005.02.23	Saint-Cyrille, Que.	Canadian National	Main-track derailment	R05Q0010
2005.05.02	Maxville, Ont.	Ottawa Central Railway	Runaway and main-track train collision	R05H0011
2005.07.04	Prescott, Ont.	Canadian National	Main-track derailment	R05H0013
2006.05.15	Lac Bouchette, Que.	Canadian National	Main-track train derailment	R06Q0046
Various	Various	Canadian Pacific Railway	Safety Issues Investigation, Analysis of secondary main-line derailments and the relationship to bulk tonnage traffic	SII R05-01

Air Reports Released in 2006-2007

DATE	LOCATION	COMPANY	EVENT	REPORT NO.
2004.01.17	Pelee Island, Ont.	Cessna 208B Caravan	Loss of control	A04H0001
2004.06.11	Bob Quinn Airstrip, B.C.	MD Helicopters (Hughes) 369D	Engine power loss	A04P0206
2004.06.13	Québec/Jean Lesage International Airport, Que.	Airbus A320 and Cessna 172	Risk of collision	A04Q0089
2004.08.19	Saint John Airport, N.B.	Piper PA-31-350 (Navajo)	Collision with terrain	A04A0099
2004.08.31	Greater Moncton International Airport, N.B.	Boeing 727	Runway excursion	A04A0110
2004.10.14	Halifax International Airport, N.S.	Boeing 747-244SF	Reduced power at take-off and collision with terrain	A04H0004

DATE	LOCATION	COMPANY	EVENT	REPORT NO.
2004.10.29	Vancouver International Airport, B.C.	Britten Norman BN2P Islander and de Havilland DHC-8	Risk of collision	A04P0397
2004.12.01	Saint-Georges, Que.	Beech B300 (Super King Air)	Runway excursion on landing	A04Q0188
2004.12.19	Gaspé Airport, Que.	Piper PA-31-350	Landing beside the runway	A04Q0196
2005.01.24	La Grande-4, Que., 60 nm SE	Eurocopter AS 350 BA (helicopter)	Collision with terrain	A05Q0008
2005.02.21	Bromont Airport, Que.	Hawker Siddeley HS 125-600A	Landing beside the runway	A05Q0024
2005.06.02	Toronto/Lester B. Pearson International Airport, Ont.	Raytheon/Hawker 800XP	Misrigged elevator trim tabs	A05O0112
2005.06.07	Tofino, B.C., 5 nm W	Bombardier DHC-8-402	Loss of oil pressure on two engines	A05P0132
2005.06.10	Lethbridge, Alta., 41 nm SE	Bombardier CRJ705	Inadvertent stick shaker at high altitude	A05W0109
2005.06.10	Richards Landing, Ont.	Bell 212 (helicopter)	Main rotor blade failure	A05O0115
2005.06.15	Abbotsford, B.C., 15 nm N	Bombardier DHC-8-402	In-flight engine shutdown	A05P0137
2005.06.18	Thompson, Man.	Stinson 108-1	Hard landing and aircraft overturned	A05C0109
2005.06.19	Abbotsford International Airport, B.C., 2 nm S	Two Piper PA-44-180 Seminole	Air proximity – safety not assured	A05P0143
2005.06.25	Oshawa Airport, Ont.	SeaRey (amphibious)	Power loss and collision with terrain	A05O0125
2005.07.10	Sudbury, Ont.	Bell 204B (helicopter)	Difficulty to control	A05O0142
2005.07.18	Constance Lake, Ont.	Cessna A185F (seaplane)	Collision with water	A05O0147
2005.07.18	Orillia, Ont., 5 nm E	Cessna 185F (seaplane)	Engine power loss	A05O0146
2005.08.02	Terrace, B.C., 35 nm NW	MD Helicopters MD500D	Loss of control	A05P0184
2005.08.22	Mount Burns, Alta.	Cessna 180H	Controlled flight into terrain	A05W0176
2005.09.01	Schefferville, Que., 20 nm NW	de Havilland DHC-2 Beaver (seaplane)	Flight into adverse weather and collision with terrain	A05Q0157
2005.09.29	Lac Ouimet, Que.	Cessna 185 (seaplane)	Capsizing at take-off	A05Q0178
2005.09.30	Kashechewan, Ont.	Piper PA-31 (Navajo)	Controlled flight into terrain	A05O0225
2005.10.06	Winnipeg, Man.	Cessna 208B Caravan	Loss of control and collision with terrain	A05C0187
2005.11.03	South Bentick Arm, B.C.	Boeing Vertol BV-107-II (helicopter)	In-flight break-up	A05P0269

DATE	LOCATION	COMPANY	EVENT	REPORT NO.
2005.11.15	Hamilton Airport, Ont.	Gulfstream 100	Runway overrun	A05O0257
2005.11.20	Brantford, Ont.	Ryan Aeronautical Navion B	Loss of control and collision with terrain	A05O0258
2005.12.07	Marystown, N.L., 2.5 nm E	Messerschmitt-Bolkow-Blohm (MBB) BO105 (helicopter)	Collision with water	A05A0155
2005.12.19	Edmonton, Alta., 70 nm N	Boeing 737-700 and Bombardier CL-600-2B19	Loss of separation	A05W0248
2005.12.26	Winnipeg International Airport, Man.	Airbus A319-112	Runway excursion	A05C0222
2006.03.08	Powell River, B.C.	Piper PA-31-350 (Chieftain)	Runway overrun and collision with terrain	A06P0036
Various	Various	Various	Safety Issues Investigation, Post-impact fires resulting from small-aircraft accidents	SII A05-01

Appendix B – Glossary

Accident	in general, a transportation occurrence that involves serious personal injury or death, or significant damage to property, in particular to the extent that safe operations are affected (for a more precise definition, see the <i>Transportation Safety Board Regulations</i>)
Incident	in general, a transportation occurrence whose consequences are less serious than those of an accident, or that could potentially have resulted in an accident (for a more precise definition, see the <i>Transportation Safety Board Regulations</i>)
Occurrence	a transportation accident or incident
Recommendation	a formal way to draw attention to systemic safety issues, normally warranting ministerial attention
Safety Advisory	a less formal means for communicating lesser safety deficiencies to officials within and outside the government
Safety Information Letter	a letter that communicates safety-related information, often concerning local safety hazards, to government and corporate officials

